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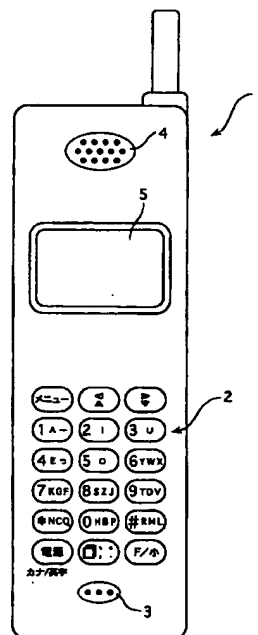
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(54) KEYPAD

(57) A keyboard input apparatus, where a plurality of main keys (21) through (32) are pressed for character inputting operation. Five keys (21) through (25) are set individually as character keys for inputting characters "A", "I", "U", "E", and "O" of the Alphabet expressing vowels. Further provided are key input detecting means to detect the number of key pressing operations of each of the keys (21) through (32), and a key input processing means for outputting the character keys corresponding to the number of key pressing operations. Setting of in the Japanese and English language frequently used vowels on independent keys (21) through (25) enables inputting of vowels by only a single key pressing operation and when compared with a conventional art where a plurality of key pressing operations are required, the number of key pressing operations can be reduced at the time of inputting vowels, whereby manipulation of the apparatus and the inputting speed can be improved.

FIG. 1



EP 0 898 222 A1

Description

Technical Field

5 [0001] The present invention relates to an apparatus for inputting Japanese or English and more particularly to a keyboard apparatus for performing input operation for a portable telephone such as PHS (Personal Handy-phone System), electronic notebook, wrist watch, small-sized word processor and personal computer.

Background Art

10 [0002] Information apparatus such as a personal computer is nowadays extensively used in offices and at home. Such information apparatus include desktop and laptop personal computers and PDAs.
 [0003] Now the typical way of inputting characters with the PDAs is by means of a keyboard.
 15 [0004] The most widely used keyboard inputting method is an input method utilizing the Alphabet. The Alphabet is widely utilized not only for inputting English but also Japanese by means of the Romanized Japanese Character input method since there are only 26 characters to memorize, enabling an operator to use the blind touch method.
 [0005] Now a conventional keyboard consists of more than 80 keys arranged in a complicated manner, making it difficult to be miniaturized. Moreover, a plurality of keys have to be manipulated by both hands, making it difficult to acquire the input operation.
 20 [0006] On the other hand, functions for inputting and storing data like addresses in telephones and wrist watches have been greatly improved and although much endeavors have been made with various kinds of apparatus requiring such miniaturization to reduce the number of keys in order to input Japanese and English characters, manipulation has not been very satisfactory.
 [0007] For instance, keys or buttons of a portable telephone with a built-in address book function is usually provided
 25 with a function for inputting characters as well. More precisely, in order to input Japanese in "Katakana", a square type of the Japanese Syllabary, with a conventional portable telephone, numerals from "1" through "0" are used to input characters in the

30 "ア行"/A Group/, "カ行"/KA Group/, "サ行"/SA

35 Group/

and so on, up to the

40 ラ行/RA Group,

including the characters

45 ワ

50 ヲン

(WA, WO and N) in the Japanese Syllabary arrangement of 50 sound syllables' order.

55 [0008] It is also configured in such a way that, when a key set to the "A Group" is pressed once, the character "A" is outputted, when pressed twice the character "I" is outputted, when pressed three times the character "U" is outputted, when pressed four times the character "E" is outputted, and when pressed five times the character "O" is outputted.

[0009] Furthermore, in order to input in English, seven keys are provided for the characters "ABC", "DEF", "GHI", "JKL", "MNO", "PQRS", "TUV" and "WXYZ" respectively, and the characters are selected and inputted corresponding to the number of pressing operations of a key.

[0010] This kind of conventional character arrangement however poses a problem in that Japanese "Kana" characters require maximum 5 times and English characters maximum 5 times of key pressing operations, making the input operation complicated and high-speed input impossible.

5 [0011] In particular, since the number of key pressing operations necessary for an input is determined without taking into consideration the frequency of usage of characters which necessitates on the average three to four times of key pressing operations when inputting a plurality of characters with the "Kana" or Alphabet, making the input operation cumbersome.

[0012] Moreover, it poses a problem that, although a long sound vowel key

10 "っ" /t/,

or a long vowel symbol /—/ are relatively frequently used in the Japanese language, it is necessary, in order to input the long sound vowel key

15 “っ”/t/,

to press a key in the

20 "タ行" /TA Group/

three times to obtain a large character

25 "っ”/T/

and then press a small character key to obtain a small character

30 “っ “/t/,

making the input operation more complicated, leading to reduction of efficiency of character input operation.

35 [0013] This kind of problem is not only limited to portable telephones but also to wrist watches with address- and schedule- keeping functions, and various types of electronic notebooks, and small-sized personal computers, where the number of keys are reduced to 12 to 15 in order to reduce the size of the apparatus.

[0014] An object of the present invention is to provide a keyboard input apparatus with the least number of keys, which is easy to learn, simple to operate and where number of key pressing operations are reduced, so as to facilitate the input operation, and which can also be easily miniaturized.

40 [0015] Moreover, a second object of the present invention is to provide, in addition to the aforementioned first object, a keyboard input apparatus where the frequently used long sound vowel key

45 "っ" /t/

and the long vowel symbol "—" can be easily inputted ,whereby the efficiency of character inputting operation can even more be improved.

50 Disclosure of Invention

[0016] The keyboard input apparatus of the present invention is characterized by the provision of 5 vowel keys and a plurality of consonant keys, the vowel keys being set independently for the characters "A", "I", "U ", "E" and "O", expressing the vowels of the Alphabet, each of the consonant keys having a plurality of characters expressing the consonants, a key input detecting means for detecting the number of consecutive key pressing operations of each of the keys and a key input processing means for outputting character keys corresponding to the number of pressing operations of a particular key.

[0017] In such a keyboard input apparatus, the most frequently used vowels both in Japanese and English, namely,

"A", "I", "U", "E" and "O" are set to independent keys, making it possible to input those characters by a single key operation. For this reason, the number of key pressing operations for inputting vowels can be reduced, and working efficiency can be improved and input operation can be speeded up, in comparison with the conventional Japanese Syllabary arrangement or the English character arrangement where vowels other than the vowel "A" need to be pressed a plural number of times to be inputted.

[0018] Moreover, since a plurality of consonants are set to each consonant key, it is possible to reduce the number of keys and minimize the size of the keyboard input apparatus compared with a keyboard apparatus of the prior art where one character is set to each key. Furthermore, due to lesser number of keys, it is easier to remember the key positions and is simpler to operate.

[0019] In addition, since a plurality of characters set in each key can be selected by the corresponding number of pressing operations of the key, a special key, such as a Shift key, can be eliminated for selecting the characters, resulting in the reduction of the number of keys and miniaturization of the apparatus is made possible. Furthermore, as the preset character keys can be selected by altering the number of key pressing operations, manipulation of the apparatus becomes more intuitive and easily comprehensible, contributing to the improvement of working efficiency.

[0020] The manipulation for the selection of character keys can be configured such that, by arranging the first to the Nth number of character keys on each of the keys, the key input processing means selects and outputs the Nth character keys when each key is pressed N number of times. More particularly, when a first and a second character keys are set to each of the keys, the key input processing means may be configured such that the first character key will be selected and outputted when the key is pressed once, and the second character key is selected and outputted when the key is pressed twice.

[0021] Setting the keyboard input apparatus in this manner facilitates the learning, and manipulation of the keyboard apparatus becomes simpler, since the number of the character keys and the number of key pressing operations required coincide in number.

[0022] The key input detecting means is preferably set so that the number of the key pressing operations already executed will be ignored when the key is pressed more number of times than the number designated for the key and recounts from the first key pressing operation.

[0023] For example, when a key set with 3 characters, is pressed 4 times, the first three pressing operations (number designated for the key) will be ignored and the remaining number, namely 1, will be registered.

[0024] By this way, the right character key can be selected by repetitious key pressing operations even if a character key is pressed a wrong number of times, resulting in an improvement of manipulation.

[0025] Moreover, the key input detecting means is preferably so set that the number of pressing operations of a key is confirmed the moment a key, other than the key just being pressed, is operated.

[0026] Since each key has to be pressed more than once, when a character key is to be selected and inputted, it is not possible, at the time the key is pressed once, to determine whether the key is going to be pressed once again or whether it has been the final key operation. For this reason it is preferable that the number of pressing operations of the precedent key be confirmed the moment a key other than the key just being pressed is operated.

[0027] By this configuration, it is possible to input a plurality of keys in succession, thereby improving the manipulation.

[0028] It is at the same time also possible to configure such that a special cursor moving key be set so that the key input detecting means confirms the number of pressing operations of the key, just been pressed, the moment the cursor moving key is operated.

[0029] Even if two character keys on a single key are to be inputted in succession and a different key cannot be inputted inbetween, it is still possible to input and confirm the characters with certainty if the cursor moving key is provided.

[0030] Again, the keyboard input apparatus is preferably so set that both the number of pressing operations of the consonant keys and inputting of the vowel keys are confirmed the moment a vowel key is pressed following a consonant key.

[0031] When Japanese is to be inputted by the Romanized character input method, keys are pressed basically in the order of "a consonant plus a vowel". For this reason, if the inputted characters can be confirmed the moment vowel keys are pressed, the cursor moving key operation can be eliminated, improving thereby the efficiency of manipulation.

[0032] On the one hand the keyboard input apparatus may also be arranged so that the number of pressing operations of the consonant keys are confirmed the moment another consonant key, a vowel key or the designated cursor moving key is pressed following a consonant key.

[0033] When English words are to be inputted, for instance, where no such a rule of "a consonant plus a vowel" exists as in the Romanized character input method, it may happen that two characters set on one single key have to be inputted in succession. In this case, the cursor-moving key may be utilized to confirm the characters. On the other hand, characters set to different keys need quite frequently to be inputted in succession also in English whereby the number of pressing operations will be increased if the characters have to be confirmed every time by the cursor moving key. Operability can thus be improved if a character input can be confirmed not only by pressing the cursor-moving key but also by pressing another consonant or a vowel key.

[0034] Moreover, the keyboard input apparatus of the present invention is characterized by having 12 keys, consisting of a matrix array of 4 vertical columns and 3 horizontal rows, five keys of which are designated as vowel keys for inputting the characters "A", "I", "U", "E" and "O", which are the Alphabet expressing the vowels, and the remaining 7 keys other than the vowels keys "A", "I", "U", "E" and "O", are designated as consonants keys where a plurality of consonants are set.

[0035] In such a keyboard input apparatus, Japanese can be inputted by the Romanized Japanese Character input method by pressing in turn the keys set for the consonants and the keys set for the vowels. For this reason, only 2 key pressing operations on the average are required for inputting in Japanese, whereby the operability and rapid inputting of characters can also be improved in comparison with the conventional Japanese Syllabary arrangement where 4 to 5 pressing operations on the average are required.

[0036] In this case it is preferable that the character keys of the Alphabet, "A", "I" and "U", expressing the vowels, be set to the 3 keys in the upper row and the character keys "E" and "O" be set to 2 of the 3 keys in the second row from the top.

[0037] In such a keyboard input apparatus, the character keys for inputting the most frequently used vowels both in English and Japanese, namely "A", "I", "U", "E" and "O" are set together in the upper two rows, making it easy to remember the positions of the frequently used vowels, thereby improving the operability.

[0038] In this case, it is preferable that the character keys for inputting the vowels "A", "I" and "U" be set to the three keys in the uppermost row from left to right in the order, and the character keys for inputting the vowels "E" and "O" be set to the two left keys in the second row from the top from left to right in the order.

[0039] When the vowels are placed in such an order, it is easy to remember the key layout and operability can thus be improved.

[0040] Moreover, three keys each of the remaining 21 consonants of the 26 Alphabet characters, namely, (K G F S Z J T D V N C Q H B P R M L Y W X), with exception of those which express the vowels, "A", "I", "U", "E" and "O", may be set to the 7 consonant keys, respectively.

[0041] Inputting of the 26 characters of the Alphabet can be realized by an extremely small number of keys, utilizing only 12 keys, consisting of 5 vowel and 7 consonant keys, thereby enabling to provide a small-sized, easy-to-carry keyboard input apparatus. Furthermore, since 3 characters are set to each of the 7 keys set for the consonants, any character can be inputted by pressing a key maximum three times because inputting of characters is actuated by pressing a key a number of times, whereby the operability can be improved and, furthermore, uniformly positioned consonant keys improve the balance of key inputting operation, contributing to a higher working efficiency. In addition, miniaturization of the keyboard input apparatus is made feasible due to only a small increase in the number of the keys.

[0042] In addition, arrangement of all the 26 characters of the Alphabet in this manner enables both to input English as well as Japanese by the Romanized character input method. In this way the Alphabet used for inputting both Japanese and English can be arranged in the same manner, making it easy to remember the key layout and thereby improving the operability.

[0043] It is again preferable that first character keys to input the characters "K", "S", "T" and "H" be set to the 4 of the 7 consonant keys respectively, and that second character keys to input the characters "G", "Z", "D" and "B" be set to the keys "K", "S", "T" and "H".

[0044] In the Romanized character input method the "G" key, which is used to input the Voiced sounds of the

"ガ"行"/GA Group/,

is set to the "K" key, which is used to input the

"カ"行 "/KA Group/ ;

the "Z" key, which is used to input the

"ザ"行 "/ZA Group/,

is set to the "S" key, which is used to input the

"サ"行 "/SA Group/ ;

the "D" key, which is used to input the

”タ”行”/DA Group/ ,

is set to the "T" key, which is used to input the

”タ行” /TA Group/ ;

and the "B" key, which is used to input the

”バ

行”/BA Group/,

is set to the "H" key, which is used to input the

”ハ

行”/HA Group/.

This arrangement allows the use of the same key for inputting the related Voiced and Voiceless sounds by altering, for instance, the number of key pressing operations, which simplifies and speeds up the input operation of the Voiced sounds.

[0045] It is also preferable that each character key be set to the 7 keys, set for the consonants, in the following combinations; "KGF", "SZJ", "TDV", "NCQ", "HBP", "RML" and "YWX".

[0046] Such an arrangement of characters allows in the Romanized character input method to set as first or second character keys the consonants, "K", "S", "T", "N", "H", "M", "Y", "R" and "W", which are

used, in combination with the vowels,

[0047] to form the characters of the

”力行”

/KA Group/ through the "WA 行"/ ワ group/,

facilitating the input operation of the consonants of the Voiceless sounds which are most frequently used next to the vowels, thereby improving even more the operability. Moreover most frequently used characters can be inputted by one or two key pressing operations, improving the operability compared with the conventional art where 1 to 5 key pressing operations are required regardless of the frequency of usage of characters.

[0048] Furthermore, numeral keys for inputting numerals "1", "2", "3", "4", "5", "6", "7", "8", "9" and "0" may also be set to 10 of the 12 keys and a mode switching device may be provided which switches over the key input modes between

the numeric input mode and the Character input mode.

[0049] If numeric keys are provided, numerals can be inputted as well as characters which enables inputting of addresses and telephone numbers particularly into portable telephones, wrist watches and address books of electronic notebooks, making it possible to input numerals, Japanese and English text with the least number of keys.

5 [0050] In other words, it is possible by utilizing only 12 keys to execute three input modes, such as Numeric Input Mode for inputting numerals and the like in the telephones, the Romanized Japanese Character input Mode, and English Input Mode, making it adaptable to many input modes, and a highly versatile keyboard input apparatus can be realized.

10 [0051] Moreover, since each numeral is set to a different key, it is possible to input each numeral with a single key pressing operation, improving manipulation and numeric input operation of various telephones, including portable telephones and facsimiles.

[0052] Moreover, since the numerals are arranged in a matrix array of 4 horizontal rows and 3 vertical columns, corresponding to the numeric arrangement of a push-button system of usual telephones, including in particular the portable telephones, electronic calculators and ten digit keyboards, making it easily adaptable to the telephones, facsimiles, 15 electronic calculators and ten digit keyboards.

[0053] It is also preferable that the mode-switching key executes the function of switching over the 3 different input modes, Numeric Input Mode, Japanese Input Mode and English Input Mode. Provision of 3 modes enables numeric input for inputting numerals in the telephones, input of Japanese by means of the Romanized character input method and input of English, making it easily adaptable to many input situations and a highly versatile keyboard input apparatus 20 can be realized. In addition, since the key layout is the same for both the Japanese and English inputting modes, it is easy to remember the positioning of each character, compared with the conventional Japanese Syllabary arrangement or alphabetically ordered English arrangement, thereby improving further the operability.

[0054] It is further preferable that a second character key for inputting the long vowel symbol "—" be set to one of the five keys set for the vowels.

25 [0055] It is furthermore preferable that a second character key for inputting the long sound vowel key

"つ" /t/

30 be set to one of the five keys set for the vowels.

[0056] Setting the long vowel symbol "—" , or the long sound vowel key

"つ" /t/

35

as a second character key to a vowel key, set solely for the vowels, enables inputting of the long vowel symbol "—" and the long sound vowel key "t" with, for instance, only two key pressing operations, facilitating the input operation of in the Japanese language frequently used long vowel symbol "—" and the long sound vowel key "t".

40 [0057] In this case, it is preferable that the long vowel symbol "—" and the long sound vowel key "t" be set to the "A" and "E" keys as second character keys. When Japanese is inputted by the Romanized character input method, it is seldom that the vowel "A" succeeds another vowel "A", or the vowel "E" succeeds another vowel "E", when compared with other vowels such as "I", "U" or "O". Hence, setting the long vowel symbol "—" and the long sound vowel key "t" to the keys set for the vowels "A" and "E" as second character keys enables inputting of the long vowel symbol "—" and the long sound vowel key "t" with ease by only two key pressing operations, thereby facilitating the input operation of in the 45 Japanese language frequently used long vowel symbol "—" and the long sound vowel key "t", thereby improving further the input efficiency and operability.

[0058] More precisely, the key input processing means is characterized such that a vowel is outputted when the long sound vowel key is pressed once, and the long vowel symbol "—" is outputted when the long sound vowel key is pressed twice in succession, and a vowel and the long vowel symbol "—" are outputted as prescribed in the long sound 50 vowel key in the order of "the vowel plus the long vowel symbol —" when the long sound vowel key is pressed three times in succession,

[0059] In such a keyboard input apparatus, a second character key for inputting the long vowel symbol "—" is set to one of the 5 vowel keys for which vowels have been designated, and the long vowel symbol "—" will be outputted by a key input processing means when the long sound vowel key is pressed twice in succession, whereby the input operation of in Japanese frequently used long vowel symbol "—" can be facilitated and the character input efficiency can be 55 improved.

[0060] Similarly, when the long sound vowel key is pressed three times in succession, the vowel and the long vowel symbol "—" are outputted by the key input processing means in the order of "the vowel plus the long vowel symbol —",

thereby improving even further the character input efficiency.

[0061] Again, the key input processing means may also be characterized such that the vowel set in the long sound vowel key is outputted when the long sound vowel key is pressed once, and the vowels set in the long sound vowel key are outputted in succession in the order of "the vowel plus the vowel" when the long sound vowel key is pressed twice in succession and the vowel and the long vowel symbol "—" set in the long sound vowel key are outputted in the order of "the vowel plus the Long sound " when the long sound vowel key is pressed 3 times in succession.

[0062] In such a keyboard input apparatus, a second character key for inputting the long vowel symbol "—" is set to one of the 5 vowel keys for which vowels have been set, and the vowel and the long vowel symbol "—" are outputted by the key input processing means in the Japanese language frequently used order of "a vowel plus the long vowel symbol "—" when the long sound vowel key is pressed three times in succession, thereby improving the character input efficiency.

[0063] Further, whether the long vowel symbol "—" or "a vowel plus a vowel " should be inputted when the long sound vowel key is pressed twice in succession, will have to be decided by the operator, taking into consideration the frequency of the two vowels being inputted in succession and either of the inventions should be selected.

[0064] Again it is preferable that the key input processing means is configured such that a vowel set to a vowel key and a vowel set to the long sound vowel key are outputted in the order of "the vowel plus the vowel set to the long sound vowel key" when the long sound vowel key is pressed once after pressing one of the four keys other than the long sound vowel key; a vowel and the long vowel symbol "—" are outputted in the order of "the vowel plus long vowel symbol "—" when the long sound vowel key is pressed twice in succession after pressing one of the four vowel keys other than the long sound vowel key; and a vowel set to a vowel key, a vowel set in the long sound vowel key, and the long vowel symbol "—" are outputted in the order of "the vowel set in the vowel key plus the vowel set in the long sound vowel key plus the long vowel symbol "—".

[0065] Even in such a case, a word including the long vowel symbol "—" can be easily outputted by two or three pressing operations of the long sound vowel key after a single pressing operation on one of the 4 vowel keys other than the long sound vowel key, attributing to an improvement of input efficiency.

[0066] Again it is preferable that the input process means be configured such that a consonant set in the consonant key, and a vowel set in the long sound vowel key are outputted in the order of "the consonant plus the vowel" when the long sound vowel key is pressed once after the consonant key; a consonant set in the consonant key, and vowels set in the long sound vowel key are outputted in the order of "the consonant plus the vowel plus the vowel" when the long sound vowel key is pressed twice in succession after the consonant key; and that a consonant set in the consonant key, and a vowel set in the vowel key and the long vowel symbol "—" are outputted in the order of "the consonant plus the vowel plus the long vowel symbol "—" when the long sound vowel key is pressed three times in succession after the consonant key.

[0067] For instance, when the "A" key is designated to be the long sound vowel key, and a certain consonant key is pressed to output the character "W" and then the "A" key is pressed successively, it will give "W plus A", inputting the character

"わ" /WA/.

[0068] When the "A" key is pressed twice in succession it will give "W plus W plus A", inputting the characters

"わあ" /WAA/.

Further, when the character "A" is pressed three times in succession, it will give "W plus A plus the long vowel symbol "—", inputting the characters

"わー" /WA—

/.

[0069] In this manner, not only Japanese can be inputted by the Romanized character input method utilizing "a con-

sonant plus a vowel" combination, but the long vowel symbol "—" can also be added to it when the long sound vowel key is pressed only three times following a consonant key, facilitating the input manipulation for characters with the long vowel symbol and input efficiency can be improved also from this standpoint.

[0070] Particularly, the long vowel symbol "—" never succeeds a consonant but always a vowel in usual Japanese. Taking this point into consideration, the apparatus is set in such a way that the long vowel symbol "—" is inputted when the vowel key is pressed twice in succession after another vowel, whereas "a consonant plus a vowel plus a vowel" are inputted when the long sound vowel key is pressed twice in succession after a consonant, improving character input operation in Japanese.

[0071] When one of the 5 vowel keys is designated as the double consonant vowel key for inputting the long sound vowel key

"つ"/t/

as a second character key, the key input apparatus may also be configured such that the key input processing means outputs a vowel when the double consonant vowel key is pressed once, and outputs the long sound vowel key

"つ"/t/

when the double consonant vowel key is pressed twice in succession, and outputs a vowel and the long sound vowel key in the order of "the vowel plus the double consonant" when the double consonant vowel key is pressed three times in succession.

[0072] Such a keyboard input apparatus is set with a second character key for inputting the long sound vowel key

"つ"/t/

in one of the 5 vowel keys where vowels are set, and the long sound vowel key

"つ"/t /

is outputted by the key input processing means, when the double consonant vowel key is pressed twice in succession, facilitating the input operation of in the Japanese language frequently used long sound vowel key

"つ"/t/,

thereby improving the character input efficiency.

[0073] Similarly, a vowel and the long sound vowel key

"つ"/t/

are outputted by the key input processing means in the Japanese language frequently used order of "a vowel plus the long sound vowel key" when the double consonant vowel key is pressed three times in succession, thereby improving further the character inputting efficiency.

[0074] Moreover, the present invention is characterized in that the key input processing means outputs a vowel set to the double consonant vowel key when the double consonant vowel key is pressed once; outputs two vowels set to the double consonant vowel key as "the vowel plus the vowel" when the double consonant vowel key is pressed twice in succession; and outputs a vowel and the long sound vowel key

"つ"/t/

set in the double consonant vowel key in the order of "the vowel plus the double consonant" when the double consonant vowel key is pressed three times in succession.

[0075] Such a key input apparatus is set with a second character key for inputting the long sound vowel key

"つ"/t/

in one of the 5 vowel keys, and a vowel and the long sound vowel key

"つ"/t/

will be outputted by the key input processing means when the double consonant vowel key is pressed three times in succession in the Japanese language frequently used order of "the vowel plus the long sound vowel key", facilitating the character input efficiency.

[0076] Furthermore, whether the long sound vowel key

"つ"/t/ ,

or " a vowel plus a vowel" are to be inputted, when the double consonant vowel key is pressed twice in succession, should be decided by taking into consideration how often the vowels set in the vowel keys, where the long sound vowel key is set, are inputted in succession, and either of the inventions should be selected.

[0077] Again, the key input processing means is preferably configured such that when the double consonant vowel key is pressed once after pressing one of the four vowel keys other than the double consonant vowel key, that the vowel set to the vowel key, and the vowel set to the double consonant vowel key, are outputted in the order of "the vowel plus the vowel, set to the double consonant vowel key"; and when the double consonant vowel key is pressed twice in succession after pressing one of the four vowel keys other than the double consonant vowel key, that the vowel set to the vowel key and the long sound vowel key

"t"/つ/

are outputted in the order of "the vowel plus the long sound vowel key"; and when the double consonant vowel key is pressed three times in succession after pressing one of the four vowel keys other than the double consonant vowel key, that the vowel set to the vowel key, and the vowel set to the double consonant vowel key and the long sound vowel key

"t"/つ/

are outputted in the order of "the vowel plus the vowel, set to the double consonant vowel key, plus the long sound vowel key".

[0078] Even in such a case, a word including the long sound vowel key

"つ"/t/

can be outputted when the double consonant vowel key is pressed twice or three times in succession after pressing one of the four vowel keys other than the double consonant vowel key, attributing to the improvement of character input efficiency.

[0079] Moreover, the keyboard input apparatus is preferably configured such that, when a plurality of consonant keys are set with the characters expressing the 21 consonants of the Alphabet other than the five keys set for the vowels, that the key input processing means outputs a consonant set to a consonant key, and a vowel set to the double consonant vowel key, in the order of "the consonant plus the vowel", when the double consonant vowel key is pressed once after pressing the consonant key; and outputs a consonant set to the consonant key, and a vowel set to the double consonant vowel key in the order of "the consonant plus the vowel plus the vowel", when the double consonant vowel key is pressed twice in succession after pressing the consonant key; and outputs a consonant set to the consonant key, and the vowel and the long sound vowel key "t" set to the double consonant vowel key and the long sound vowel key "t" in the order of "the consonant plus the vowel plus the long sound vowel key", when the double consonant vowel key is pressed three times in succession after pressing the consonant key.

[0080] In this case the key input apparatus may also be set such that a consonant set to the consonant key, and a vowel and the double consonant "t" set to the double consonant vowel key are outputted in the order of "the consonant plus the vowel plus the vowel plus the double consonant " when the double consonant vowel key is pressed four times in succession after pressing a consonant key.

5 [0081] For example, when the key "E" is to be designated as the double consonant vowel key, and when any one of the consonant keys is pressed to select the character "N", and then the "E" key is pressed in succession, it gives "N plus E", inputting as a result the character

10 "ね"/NE/.

Now, when the "E" key is pressed twice in succession, it gives "N plus E plus E", inputting the characters

15 "ねえ"/NEE/.

Further, when the "E" key is pressed 3 times in succession, it gives

20 "N plus E plus つ(t) ",

inputting the characters

25 "ねっ"/ NE っ/t/ .

[0082] Now, when the processing means is set also for four key pressing operations, and when the "E" key is pressed four times in succession, it gives

30 "N plus E plus E plus っ/t/" ,

inputting the characters

35 "ねえっ"/NEE

40 っ/t/.

45 [0083] In this way, not only can Japanese text be inputted by the Romanized character input method by means of "a consonant plus a vowel" combination by pressing consecutively the double consonant vowel key, but also the long sound vowel key "t" can be added thereto, enabling to input characters including the long sound vowel key with ease, thereby improving the input efficiency also from this standpoint.

50 [0084] Particularly, a consonant is never succeeded by the double consonant "t" but by a vowel in generally used Japanese. Taking this into consideration, the long sound vowel key "t" is arranged to be inputted when the double consonant vowel key is pressed twice in succession after pressing another vowel, whereas " a consonant plus a vowel plus Vowel" are outputted when the double consonant vowel key is pressed twice in succession after a consonant key, so that the Romanized character input method can be most advantageously utilized, thereby improving the Japanese character input efficiency.

55 [0085] Moreover, if the apparatus is set, in consideration of the frequency of usage of character arrangement in Japanese, in such a way that the characters are inputted in the order of "a consonant plus a vowel plus a vowel plus the long sound vowel key " when the double consonant vowel key is pressed four times in succession after pressing a consonant key, characters including a vowel and the long sound vowel key can be inputted even more easily, thereby

FIG. 8

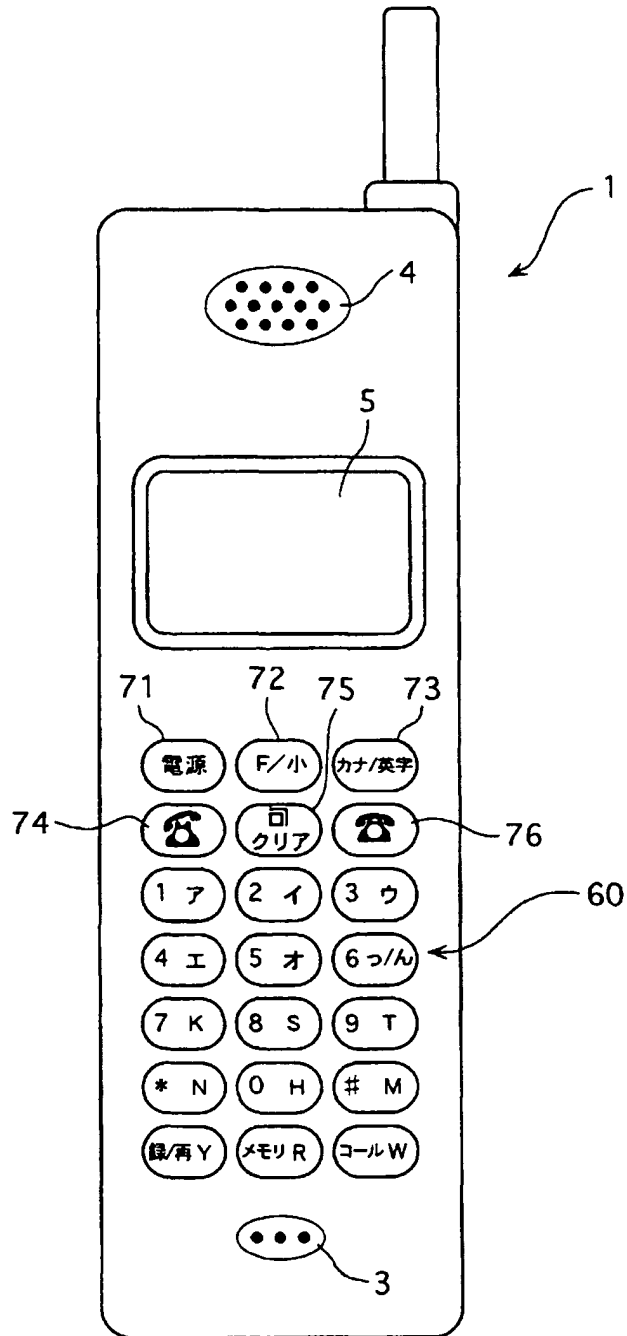


FIG. 9

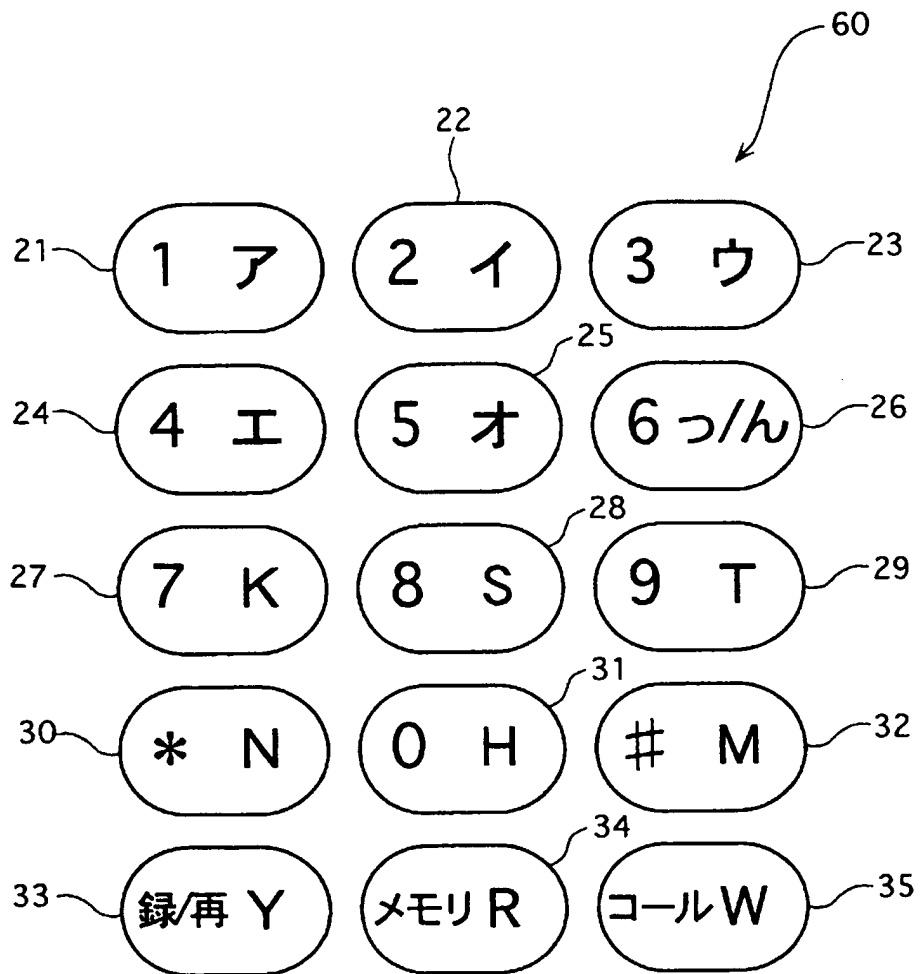


FIG.10

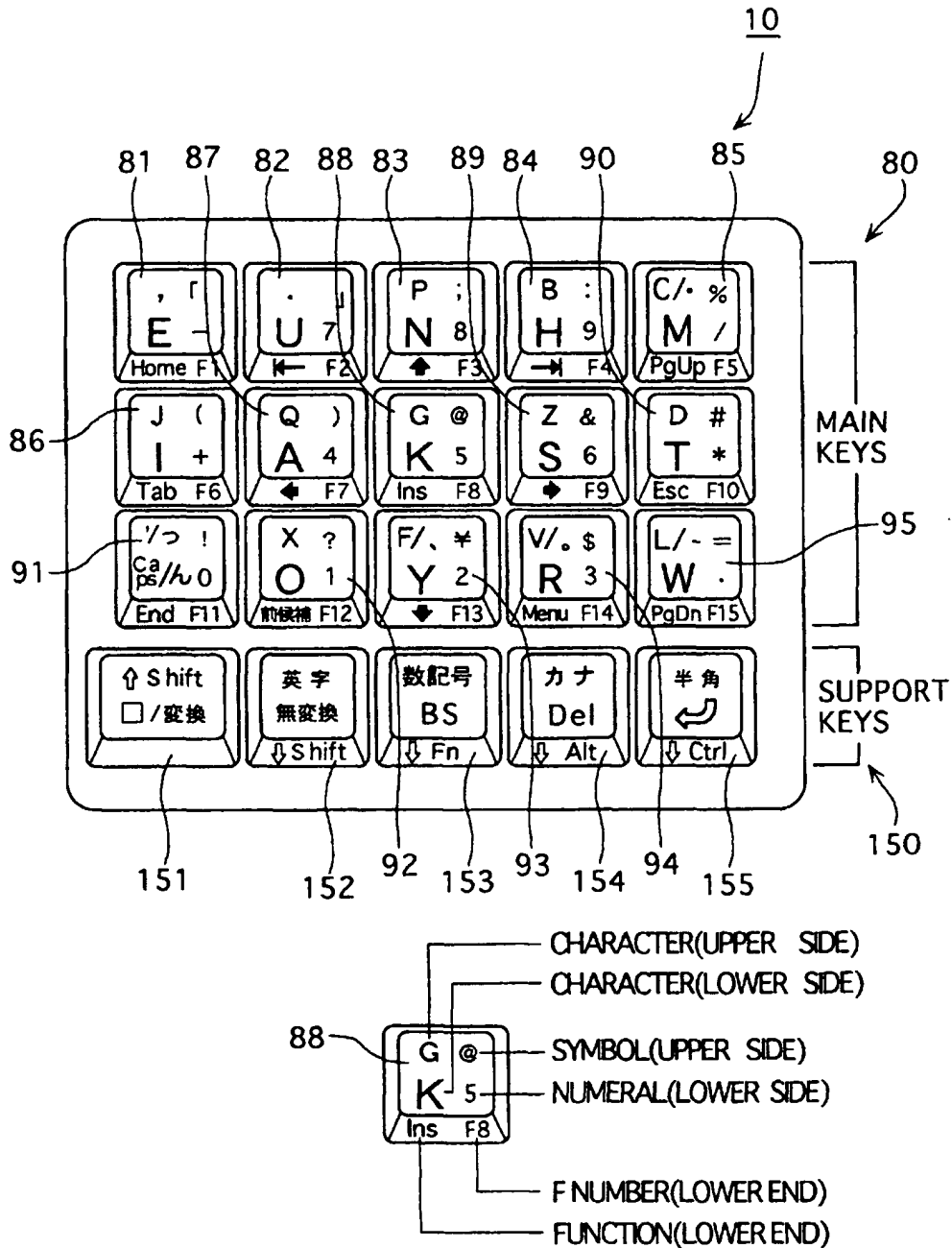


FIG. 11

